ELASTIC

RUBBER-RING TOURNIQUET.

BY

ARTHUR ED. SPOHN, M. D.,

CORPUS CHRISTI, TEXAS.

FROM THE NOVEMBER NO. RICHMOND AND LOUISVILLE MEDICAL JOURNAL.

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I noticed an article in the American edition of the "London Lancet" for August, 1876, on "An Improved Appliance for Bloodless Operations," which purports to be an improvement made by Mr. H. L. Browne, Surgeon to the West Broomwich Hospital.

As the subject of elastic-ring tourniquets has been attracting my attention for the past six years, during which time I have made many experiments with the same, I can not, in justice to myself, allow said article to pass unnoticed, as it seems to me impossible that the use of said tourniquet, which has been on exhibition in many of the principal cities of America, been shown and explained in several prominent hospitals and before several medical societies, should not have reached Mr. H. L. Browne; however, should the use of the elastic rings have been conceived by Mr. Browne independently and without knowledge of their use in America, I can not, of course, take any exception to said article.

The rings used by myself and shown to the Profession consist of a set of nine, six of which were precisely similar to those described in the "Lancet," with three smaller rings for the thumb and fingers, which completes the set as made by Geo. Tiemann & Co., of New York, the following being an extract from a letter from that firm, dated June 17, 1875: "Regarding your new idea of rolling-rubber rings for Esmarch's operation, we think the idea is capital. It must be a remarkably quick process and so simple." Again they write me: "New York June 29, 1875. We just now finished a number of your new tourniquet rings. The idea strikes us as really excellent.'

In a communication of October 15, 1875, they write: "You must publish them—the sooner the better—before others may catch the idea."

My elastic-ring tourniquet was exhibited at Charity Hospital,

New Orleans, La., to Drs. Choppin, Schuppert, and Smythe, October, 1875; at the Boyle County (Ky.) Medical Society, September, 1875; at the city of Hamilton, Canada, in August, and at the January (1875) meeting of the Southwestern Texas Medical Association, of which I have the honor to be Vice-President, thus placing the general knowledge and use of the instrument pretty well before the Profession.

The following is an article forwarded for publication in the "New York Medical Record," February, 1876, but as it was not published, I suppose it must have been miscarried or lost:

A New Elastic Rubber-Ring Tourniquet.—As so many new surgical instruments are now brought before the attention of the Profession, it almost seems necessary for me to offer some apology for introducing a new tourniquet for bloodless operations, also for general use where such instruments are indicated. This instrument I have called the "elastic rubber-ring tourniquet." The necessity for such an instrument was brought to my notice when residing in the city of New Mexico, while attempting to remove a needle from the thumb of a young lady, April, 1870. Having made several unsuccessful attempts, on account of hæmorrhage, I wound an ordinary elastic band around the end of the thumb, and rolled it back beyond the site of the needle, noticing that the thumb was completely bloodless, presenting a waxy appearance, which enabled me to remove the needle without difficulty or loss of blood.

The idea of an elastic ring tourniquet for bloodless operations did not then enter my mind, nor indeed until I noticed the favorable reports of the instrument devised by Professor Esmarch, and in using his instruments for the removal of a thorn from the knee of a young man October 7th, 1874. I thought a simpler method might be adopted by using solid and hollow rubber rings of assorted sizes to fit every limb, and requested Messrs. George Tiemann & Co., of New York, to have a set made for me, which really surpassed my expectations, easily adjusted and perfectly controlling the circulation. The rings described in the "Lancet" are precisely similar to the first set I had made (the smaller of which is for the fingers and wrist) were perfect; but in applying the rings to the thigh, I

found the solid rings would not roll well, especially in cases of considerable obesity, and by the advice of my partner, Dr. T. Somerville Burke, I had the larger rings made hollow, which, I believe, is a decided advantage, making them roll with greater facility, also preventing the hairs from rolling around the ring which is to be avoided, as it is the cause of much pain.

In applying the rings, one side may be raised to pass painful or diseased parts, or the ring may be stretched and thus placed above the seat of the part injured or diseased, thereby avoiding the entrance into the circulation of septic fluids, an objection which has been made against the use of the elastic bandage.

The simplicity of this instrument will, I believe, at once recommend its general use, whether for bloodless operations or as a simple tourniquet. I find that very little elastic pressure is necessary to control the circulation even in the stoutest subjects, and by using a very weak ring over the arm outside of the ordinary clothing, I have rendered the whole limb perfectly pulseless, a fact that would make such an instrument invaluable on the battle-field, where numerous lives are sacrificed by the inability of most persons in applying the ordinary instrument now in use.

In using the tourniquet, that part of the instrument lying over the main artery should be raised before closing the wound, so that in case there is any hæmorrhage the vessel may be ligated or twisted. The rings for the arm and forearm should fit the wrist firmly; those for the thigh and leg, the ankle.

The great advantage I claim for this instrument is its simplicity and facility of application, forcing the blood out of the limb gradually in its direct channel without injuring the tissues, which must necessarily occur in using the bandage, which is rolled around the limb, leaving, as it must, blood between the different turns of the roller, producing on many occasions ecchymosis from injury done to the minute capillaries.

I have applied the instrument many times upon my own arm, rendering it perfectly blanched and bloodless, and have never felt the least inconvenience after using the strongest rings.

There are many cases for which I might recommend this instrument, but believe it will suggest its own use whenever

necessary to prevent loss of blood, or the entrance into the circulation of any poisonous matter which may be brought in contact with the extremities, as dissection wounds, bites of animals, reptiles, etc., by stretching a firm ring and placing it above the poisoned part.

To say more, would simply be a repetition of what has already been published regarding the advantages derived from the use of the admirable instrument devised by Prof. Esmarch, of which I consider my rings an improvement, trusting they may be of some service to the Profession, and those who may be so unfortunate as to require their use.

The above, I trust, will satisfactorily explain the origin and use of the "Elastic Rubber-Ring Tourniquet" first used by myself in 1870, and manufactured by George Tiemann & Co., of New York, June 1875; not that I wish to claim priority over Esmarch in the use of the elastic tourniquet, but to show that the "Elastic Rubber-Ring Tourniquet" was used by myself, and brought before the notice of the Profession in America at least two years previous to the publication in the "Lancet," describing an instrument precisely similar to those manufactured for me by Tiemann.

Cases in which I have used the instrument successfully:

CASE I.—A young lady consulted me March 16, 1875, for contraction of one of her fingers, caused by a whitlow. The finger was perfectly useless, being drawn down into the palm of the hand. I rolled a ring over the hand as far as the wrist, rendering it perfectly bloodless, made a V-shaped incision, and divided all the adhesions drawing the finger down. There was *not a drop* of blood lost, enabling me to complete my dissections without injuring the tendons. I straightened the finger without difficulty, applied a palma splint, and in a few weeks she recovered perfect use of her finger, and at the present time the deformity is scarcely perceptible.

CASE II.—On the 15th of October, 1875, a young man came into my office suffering severely from the effects of a splinter deeply embedded in the palm of his hand. Several unsuccessful attempts had been made to remove it, but the hæmorrhage obscured a thorough examination of the parts involved. I

have no doubt but the elastic bandage would have answered equally well in this case, but having one of my rings with me, I rolled it over the hand and removed the splinter without difficulty or the loss of blood. After removing the ring a little hæmorrhage occurred, but not sufficient to require attention. I have since used them many times on similar occasions, with good success; also in amputation of fingers, etc.

CASE III.—On the 4th of July, while firing the midday centennial salute, Mr. Stanley Welch, Deputy Collector U. S. Customs, District of Corpus Christi, had his right hand and part of the forearm blown away by the accidental discharge of a cannon. He lost considerable blood, which was difficult to control until I placed one of my rings over the arm near the shoulder, when the hæmorrhage immediately ceased. The forearm was amputated near the elbow, and although the instrument was not rolled up, but applied as an ordinary tourniquet, there was no hœmorrhage during the operation. He made a quick recovery.

I may here state to show how little *elastic pressure* is necessary to control the circulation, that after Mr. Welch's arm was dressed, there was considerable oozing from, I think, a small vessel we omitted to ligate. One of the surgeons in attendance wished to reöpen the stump, but by my advice a weak ring was placed around the arm above the stump. It controlled the hæmorrhage, but made too much pressure, becoming painful. It was replaced by a very weak elastic band, which I had found very useful in similar cases, answering equally well; also beneficial in keeping the parts in apposition, moulding as it were one upon the other, an improvement on the ordinary mode of dressing.

It seems impossible to estimate the *elastic force* necessary to control the circulation; and in my experience, which extends over several years, I find very weak rings are quite sufficient for any operation, nor do I consider the plug, as shown in the "Lancet," of any use whatever; on the contrary, the vessel is apt to slip to one side or the other, and rest in a notch between the plug and ring; a small rubber pad might be used over deep-seated vessels, but I think the rings alone are sufficient.

This instrument is manufactured by Messrs. Geo. Tiemann & Co., No. 67 Chatham street, New York.

NOTE.—The rubber rings used by me and made by George Tiemann & Co. of New York, are of nine sizes, as follows: No. 1 is made of solid rubber cord one-eighth of an inch thick; the ring measuring in its diameter from outside to outside four-eighths of an inch. No. 2 is also of solid rubber cord of the same thickness; this ring measuring five-eighths of an inch in diameter measured from outside to outside. No. 3 is of solid rubber cord also; measuring from outside to outside seven-eighths of an inch; this cord is a little thicker than that used for Nos. 1 and 2. No. 4 is of solid rubber cord one-fourth of an inch thick; the diameter of the ring measuring from outside to outside 1¼ inch. No. 5 is of solid rubber cord three-eighths of an inch thick; the ring in its diameter from outside to outside measuring 1⅞ inch. No. 6 is also of solid rubber cord three-eighths of an inch thick; the ring from outside to outside measuring 2⅛ inches. No. 7 is of hollow rubber tubing half an inch in diameter, the rubber composing this tube being one-eighth of an inch thick; this ring measures in its diameter from outside to ouside 2¾ inches. No. 8 is also of hollow rubber tubing three-fourths of an inch in diameter; the rubber composing the tube being three-sixteenths of an inch thick; this ring measures in its diameter from outside to outside 3⅜ inches. No. 9, the largest ring, is made of rubber tubing 1 inch in diameter, the rubber being one-fourth of an inch thick; this ring measured in its diameter from outside is 4½ inches.

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